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(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
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Method for presenting menu buttons

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Method for presenting menu buttons

Field of the invention

This invention relates to a method for presenting menu buttons for an optical storage medium.

Background

Today's optical storage media formats are capable of supporting visual menus, e.g. for content management or control functions. Applications of such visual menus are the selection of one out of multiple titles on the disc, the selection of a chapter within a title, and others. From the user perspective, such menus consist of a number of buttons shown on the display. The user may navigate within the menu, e.g. by pushing the up, down, left and right buttons on his remote control to select a menu button, and may activate a menu button through some kind of "OK" button on the remote control. An indicator, usually a highlight or an arrow, may provide feedback to the user, showing which button is currently selected or activated. A menu button may have one of the states "normal", "selected" or "activated".

However, known DVD menus are rather limited concerning extra features, since they contain only static visual buttons.

Further, a subtitling specification contained in the document "ETS 300 743: Digital Video Broadcasting (DVB);

Subtitling System" (DVB-ST), provided by the European Telecommunication Standardization Institute (ETSI), is known for embedding subtitles into video sequences.

Summary of the Invention

The present invention may provide to the user who operates an electronic menu related to an optical storage medium a more flexible menu system than known from DVD-Video. Particularly, the disclosed method allows operating menu buttons that are not being displayed, as disclosed in claim 1. Further, a method is disclosed to enhance menu pages by adding non-button objects, e.g. text or graphical symbols. Usually the menu data will be read from the storage medium and processed by an appropriate processing device, so that the data can be used for creating a menu for controlling e.g. a presentation of audio and/or video data stored on the medium.

According to the invention, only some buttons of an electronic menu are shown on a display, while the menu may comprise further functions that are not represented by buttons on the display, but the further functions may also be activated via a user interface. Additionally, a sound or sound sequence may be attached to some or all menu buttons, depending on the buttons state. Sounds are e.g. a click or a melody, or a speech sequence. The current invention also provides a data structure to describe the new features.

Advantageous embodiments of the invention are disclosed in the dependent claims, the following description and the figures.

Brief description of the drawings

Exemplary embodiments of the invention are described with reference to the accompanying drawings, which show in

Fig.1 a multi-page visual menu including invisible buttons;

Fig.2 a visual menu page including a non-button object.

Detailed description of the invention

The format for Blu-ray Pre-Recorded menus foresees 3 images for 3 button states. There is one image for the 'normal' button state, one image for the 'selected' button state and another image for the 'activated' button state. In addition to that it is foreseen that, similar to DVD-Video, buttons can be selected directly, e.g. through the numerical keys on the remote control.

This invention disclosure describes a solution for buttons that can be selected through the numerical keys on the remote control, but that don't have any image associated with the "button". In a sense, this allows to create "invisible buttons. An invisible button typically has an association with a single remote control key, e.g. '0' through '9', and in addition to that, it has button commands associated with the button. If the remote control allows to input numbers other than '0'-'9', e.g. 10, 11,..., or -1, -2, -3, an invisible button can also have an association with such a multi-digit number.

Further, in one embodiment of the invention it is possible that one or more menu buttons are not displayable at all.

Amongst others, typical applications for this "invisible button" feature are multi-page menus, interactive games, or access control for content stored on a storage medium.

In case of multi-page menus, like for instance chapter menus, invisible buttons can be used to access chapters directly through remote control keys, without explicitly accessing the page that holds a visible button image for that chapter. This situation is shown in Fig.1. In the example, the multi-page menu consists of 3 menu pages, menu page 1 through 3. The menu allows users to have direct access to chapters on the disc. Menu Page 1 holds 3 visible buttons, namely "Chapter #1", "Chapter #2" and "Next". In addition to the visible buttons, menu page 1 also holds 4 invisible buttons, namely "Chapter #3", "Chapter #4", "Chapter #5" and "Chapter #6". If the user presses the "1" key on the remote control while Menu Page 1 is displayed, the visible button "Chapter #1" becomes activated. If the user presses the "4" key on the remote control, the invisible button "Chapter #4" becomes activated.

Because the number of chapters can be quite large, it is very beneficial if multi-digit numbers can be input through remote control keys.

Additionally, the visible buttons may be used as known from today's implementations. The user may select and activate one of the visible buttons, e.g. in Fig.1 the "Chapter #1" button or the "Chapter #2" button, by pressing a "Selection Up/Down" key, and separately activate the selected button

by pressing an "OK" key. Further, the user may switch to another menu page to be displayed, and select and activate one of the displayed menu buttons conventionally.

In the case of interactive games, invisible buttons can be used e.g. to let the user input some numbers that are used in multiple-choice games, but also to input some guessing result. One simple example of this application is a quiz game, where the user is asked to guess the age of the actress, or to guess the year, when the automobile was invented.

Another advantage of invisible buttons is that menu items can be hidden, or secret. In disc media applications, this can be used to protect e.g. adult or private content from unauthorized access. In such a situation it is beneficial if the numbers that are input will not become visible on the screen. Thus, invisible buttons can be used.

Further, this invention disclosure describes a solution to insert other graphical objects, not being a button, into a menu page layout.

Typical applications for this feature are menu screens that come with a title line, as shown in Fig.1 and Fig.2, or some other explanation that is laid out on the screen, but that is not intended to be selectable. Fig.2 shows a menu screen including three button objects and a text field, with the text field being a non-button object. Other than the button objects, non-button objects may not be selected or activated.

Both solutions together, invisible buttons and non-button objects, result in a solution that is more flexible than the menu system known from DVD-Video.

When the user presses on the remote control a key or key sequence corresponding to an invisible button, this can have two effects. In one embodiment of the invention, the invisible menu button is selected, and the selected menu button may be displayed on the screen. The associated function is executed when the user gives a confirmation, e.g. presses an "OK" button. In another embodiment the invisible menu button is activated and the corresponding function is executed without user confirmation.

An example for a menu page composition segment for Blu-ray discs is given in Tab.1. The semantics of the fields of the menu page composition segment is identical to that given in Section "7.2.1 Page composition segment" of the DVB-ST standard for fields of the same name. Additionally, the following semantic definitions apply.

All addressing of pixels is based on a coordinate system whose origin is defined by the top-left corner of the associated video. Pixel addresses increase from left to right and from top to bottom. The dimensions of the associated video are defined as video_width x video_height.

Syntax	Size	Type
menu_page_composition_segment() {		
sync_byte	8	bslbf
segment_type	8	bslbf
page_id	16	bslbf
segment_length	16	uimsbf
page_time_out	32	uimsbf
selection_time_out	32	uimsbf
UOP_mask	64	uimsbf
animation_frame_rate_code	4	uimsbf

page_version_number	4	uimsbf
page_state	2	bslbf
reserved	6	bslbf
button_offset_number	8	uimsbf
num_of_buttons	8	uimsbf
num_of_numerical_select_buttons	8	uimsbf
default_selected_button	8	uimsbf
default_activated_button	8	uimsbf
num_of_graphics	8	uimsbf
for(button_id=0;button_id < num_of_buttons; button_id++) {		
visible_flag	1	bslbf
reserved	7	bslbf
If (visible_flag) {		
auto_action_mode	8	uimsbf
button_horizontal_address	16	uimsbf
button_vertical_address	16	uimsbf
neighbour_info() {		
upper_button_id	8	uimsbf
lower_button_id	8	uimsbf
left_button_id	8	uimsbf
right_button_id	8	uimsbf
}		
normal_state_info() {		
start_region_id_normal	8	uimsbf
end_region_id_normal	8	uimsbf
}		
selected_state_info() {		
start_region_id_selected	8	uimsbf
end_region_id_selected	8	uimsbf
}		
action_state_info() {		
start_region_id_activated	8	uimsbf
end_region_id_activated	8	uimsbf
}		
}		
num_of_button_command_bytes	8	uimsbf
for(i=0;i < num_of_button_command_bytes; i++) {		
button_command_data_byte()		
}		
}		
for(i=0;i < num_of_graphics; i++) {		
graphic_horizontal_address	16	uimsbf
graphic_vertical_address	16	uimsbf
graphic_start_region_id	8	uimsbf
graphic_end_region_id	8	uimsbf
}		
}		

Tab.1: Exemplary menu page composition segment

The menu page composition segment may be signalled by setting e.g. segment_type = 0x18.

The page_time_out field indicates the time when the menu page composition segment becomes invalid, and the menu page should disappear from the screen. This value is measured in units of 90kHz clock relative from the beginning of this menu page composition segment's presentation time stamp (PTS) and shall be put on frame grid.

The selection_time_out field indicates the time when the button selection valid period ends. This value is measured in units of 90kHz clock relative from the beginning of this menu page composition segment's PTS and shall be put on frame grid. This value shall be smaller than page_time_out.

The UOP_mask field indicates the mask that prohibits some user operations. Each bit refers to a user operation and Least Significant Bit (LSB) refers to user operation #0. Each bit indicates prohibition of user operation as follows:

0b - Corresponding user operation is permitted
1b - Corresponding user operation is prohibited

The button_offset_number field indicates the button offset number applied to all button_ids to calculate the user button number.

The num_of_buttons field indicates the number of buttons in this menu page.

The num_of_numerical_select_buttons field indicates the number of buttons that can be selected numerically by the user within this menu page.

The default_selected_button field indicates the button number that is selected by default when presentation of the menu page starts. When this value is set to e.g. 0xFF, no button is selected by default.

The default_activated_button field indicates the button number that is automatically activated when no button was activated by the user within the selection period. When this value is set to e.g. 0xFF, no button is automatically activated.

The num_of_graphics field indicates the number of additional graphical elements in this menu page. A graphical element is not selectable by the user and has no associated commands.

If the visible_flag is set to '1' it indicates that a button has a visual representation. For all buttons with button_id > num_of_numerical_select_buttons, this flag is set to '1'. In other words, if a button is not numerical selectable, it shall be visible.

The auto_action_mode field indicates the operation mode of a button: if it is 0, the state of the corresponding button is transferred to the selected state when that button is selected. Otherwise, if it is 0x1, the state of the corresponding button is transferred to the activated state without displaying the selected button image when that button is selected.

The num_of_button_command_bytes field indicates the number of command bytes that are associated with the button.

The button_command_data_byte() field stores a single byte from a sequence of variable length BD-ROM commands. The sequence of commands is executed, when the corresponding button is activated.

The graphic_horizontal_address field specifies the horizontal address of the top left pixel of the graphical object. The specified horizontal position may be in the range between 0 and video_width-1.

The graphic_vertical_address field specifies the vertical address of the top left pixel of the graphical object. The specified vertical position may be in the range between 0 and video_height-1.

The graphic_start_region_id field specifies the ID of the first region, which may be presented for the graphical element.

The graphic_end_region_id field specifies the ID of the last region, which shall be presented for the graphical element. All regions with IDs between start_region_id and end_region_id shall exist; if start_region_id differs from end_region_id, that sequence of regions shall be presented cyclically with the animation frame rate described by animation_frame_rate_code.

In one embodiment of the invention it is possible that only non-button objects are displayed on a menu screen, while

all buttons are invisible. When the user enters the menu mode by pressing an appropriate button, a non-button element, e.g. text or picture element, may be displayed in one region of the screen, indicating that menu mode is active. The user may get the information about which key to press for activating a menu button from another source, e.g. manual, or may have learned it from previous usage of the menu. E.g. it may also be possible to toggle the mode of one or more menu buttons between visible and invisible. Advantageously, with the inventive menu the currently presented video is less disturbed while the menu is accessed, e.g. for changing presentation preferences like subtitle language or font.

Advantageously, the invention also provides the possibility to give aural feedback to the user. If a button is either in the "selected" state or in the "activated" state, it may be assigned a sound identifier associated with a sound, which may be stored on the storage medium. The associated sound is played back when the button enters the respective button state. In one embodiment of the invention the associated sound is played back repeatedly, as long as the button is in the respective state.

The invention may be used particularly for menus stored on Blu-ray discs, but also DVD or other optical or non-optical high-capacity storage media. Further, it is interesting for prerecorded media, i.e. read-only media or write-once media.

Claims

1. A method for representing one or more menu buttons for an electronic menu, the menu button having an associated state, wherein the possible states associated with a button may comprise unselected, selected or activated state, wherein
   - data representing the menu items and the menu buttons are stored on a storage medium;
   - a menu button for an existing menu function may be not represented on the display; and
   - a menu button not represented on the display may be selected or activated by pressing a key or key sequence on a remote control.

2. Method according to claim 1, wherein one or more menu buttons or menu items have a static state and no associated function.

3. Method according to any of the previous claims, wherein a sound or sound sequence may be associated to a state of a menu button, the sound or sound sequence being played back upon entry of the button into the associated state.

4. Method according to any of the previous claims, wherein the display position of a menu button is determined by a region identifier, the region identifier being stored on said storage medium.

5. Method according to any of the previous claims, wherein the data structure on said storage medium contains a data segment defining the page

composition, the data segment containing said data representing the menu items and the menu buttons.

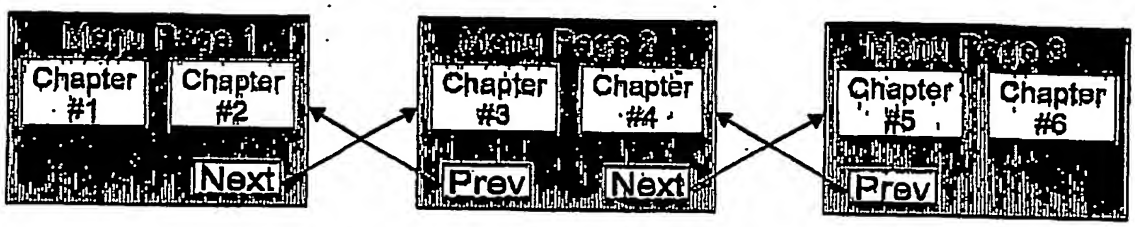
6. Method according to any of the previous claims, wherein said storage medium is an optical storage medium.

Abstract

Optical storage media often contain data structures for a menu suitable for selection of a title, a chapter, a parameter or others. Such menus usually comprise a number of buttons to be displayed, with each button having a state. Possible states of buttons are e.g. "unselected", "selected" or "activated". According to the invention, the menu may contain buttons that can be selected through the numerical keys on the remote control, but that don't have any images or text associated. This allows creating "invisible buttons". Further, a sound or sound sequence, e.g. melody or click, may be associated to a buttons state, and may be played back when the button enters this state. Such menu data may be stored e.g. on a Blu-ray disc.

Fig.1

Visible Buttons:



Invisible Buttons:

Chapter #3	Chapter #1	Chapter #1
Chapter #4	Chapter #2	Chapter #2
Chapter #5	Chapter #5	Chapter #3
Chapter #6	Chapter #6	Chapter #4

Fig.1

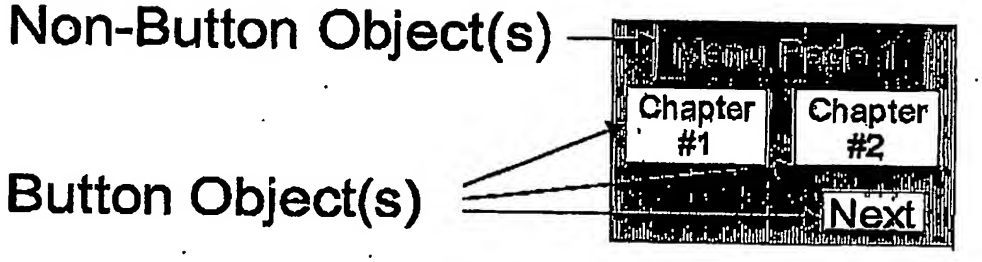


Fig.2

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